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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,091	12/21/2001	Stephen R. Forrest	10644/11902	8289

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EXAMINER

YAMNITZKY, MARIE ROSE

ART UNIT

PAPER NUMBER

1774

DATE MAILED: 02/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/026,091	<b>Applicant(s)</b> FORREST ET AL.	
	<b>Examiner</b> Marie R. Yamnitzky	<b>Art Unit</b> 1774	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12/21/01, 02/15/02 & 09/19/02.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 54-74 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 54-74 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                    | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                           | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2,4</u> . | 6) <input type="checkbox"/> Other: _____                                    |

1. The preliminary amendment filed 02/15/02 (Paper No. 3), which amends the specification, cancels claims 1-43 and adds claims 54-74, has been entered.

Claims 54-74 are pending.

2. Claim 66 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The limitations of claim 66 are indefinite because, as disclosed in the specification, maximum internal quantum efficiency and external quantum efficiency are not constants for a particular device. For example, see page 19, second paragraph. A device meeting the limitations of claim 66 for one set of ambient conditions will not necessarily meet the claim limitations for a second set of ambient conditions.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 54, 55, 57-65 and 67-74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (5,350,459) in view of Sariciftci et al. (5,311,183), Kusian et al. (5,527,716) and Nath et al. (4,773,944).

See the whole Suzuki patent. In particular, see column 1, lines 6-9, c. 4, l. 3-23, c. 4, l. 39-49, c. 40, l. 33-44, c. 41, l. 20-34 and c. 43, l. 19-25.

Suzuki et al. require that "at least one" of the first or second electrode be transparent. Although there is no requirement for two transparent electrodes, two transparent electrodes are clearly within the scope of Suzuki's "at least one". It would have been obvious to one of ordinary skill in the art at the time of the invention to make Suzuki's organic photovoltaic element with two transparent electrodes so as to attain the advantages provided by having two transparent electrodes such as being able to expose the photoconductive layers to electromagnetic radiation through either electrode. As taught in the first paragraph of column 4 of the Suzuki patent, the light incident side of the photovoltaic element must have an electrode with high transparency. From this teaching and as a matter of common sense, one of ordinary skill in the art would readily recognize that by having two transparent electrodes, either side of the photovoltaic element can be the light incident side, and the photovoltaic element will be functional regardless of which side the light is incident upon.

Suzuki et al. do not disclose a device having two transparent electrodes that are metal substitute electrode layers such as electrode layers made of conductive oxides or conductive polymers. Suzuki et al. teach the use of metal oxide (indium tin oxide, tin oxide, and indium oxide) for the electrode which must be transparent, and teach the use of metals for the other electrode.

Sariciftci et al. disclose photosensitive optoelectronic devices and teach that one conducting electrode layer may be a metal layer, a conducting layer made of mixed oxides such

as indium/tin oxide, or a conducting polymer layer such as polyaniline, and that a second conducting layer which is required to be a transparent conducting layer may be a conducting layer made of mixed oxides such as indium/tin oxide or a conducting polymer layer such as polyaniline. In particular, see column 5, lines 39-48 and c. 6, l. 6-17 of the Sariciftci patent.

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to use a conductive metal oxide such as indium/tin oxide or a conducting polymer such as polyaniline to make a photovoltaic device according to Suzuki et al. having two transparent electrodes. One of ordinary skill in the art would have been motivated to do so by Sariciftci's disclosure of conductive polymers and conductive metal oxides as equivalents of metal in the manufacture of electrodes for a photovoltaic device, and by Sariciftci's disclosure of conductive polymers such as polyaniline and conductive metal oxides such as indium tin oxide as equivalents in the manufacture of transparent electrodes for a photovoltaic device.

Neither Suzuki nor Sariciftci disclose the stacking of at least two photovoltaic cells and the electrical connection of the stacked cells.

Kusian et al. disclose that the stacking of solar cells, and the electrical connection of stacked solar cells in series or in parallel, is known in the art (e.g. see col. 1, line 41-c. 2, l. 5). Nath et al. disclose a photovoltaic device having multiple photovoltaic cells connected in series and multiple photovoltaic cells connected in parallel (e.g. see col. 1, lines 8-17). Although the Kusian and Nath patents are directed to inorganic, rather than organic, solar cells, it is the examiner's position that one of ordinary skill in the art of solar cells at the time of the invention would have been motivated to stack multiples of Suzuki's photovoltaic cells, and electrically

connect multiple cells in series or in parallel, in order to obtain the advantages of electrically connecting multiple cells as taught by Kusian or Nath.

5. Claims 63-65 and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zinchuk (4,060,426) in view of Kusian et al. (5,527,716) and Nath et al. (4,773,944).

See the whole Zinchuk patent. In particular, see column 1, line 13-c. 2, l. 3, c. 2, l. 29-51, c. 3, l. 62-c. 5, l. 21, c. 7, l. 53-c. 8, l. 45 and c. 9, l. 37-47. Zinchuk discloses a photosensitive optoelectronic device having two transparent electrode layers wherein each of the transparent electrode layers is made of tin oxide-indium oxide. A photoconductive organic layer is disposed between the two transparent electrode layers.

Zinchuk does not disclose the stacking of at least two photovoltaic cells and the electrical connection of the stacked cells although Zinchuk does disclose that a device may comprise multiple cells (e.g. c. 9, l. 37-47).

Kusian et al. disclose that the stacking of solar cells, and the electrical connection of stacked solar cells in series or in parallel is known in the art (e.g. see column 1, line 41-c. 2, l. 5). Nath et al. disclose a photovoltaic device having multiple photovoltaic cells connected in series and multiple photovoltaic cells connected in parallel (e.g. see column 1, lines 8-17). Although the Kusian and Nath patents are directed to inorganic, rather than organic, solar cells, it is the examiner's position that one of ordinary skill in the art of solar cells at the time of the invention would have been motivated to stack multiples of Zinchuk's photovoltaic cells, and electrically

Art Unit: 1774

connect multiple cells in series or in parallel, in order to obtain the advantages of electrically connecting multiple cells as taught by Kusian or Nath.

6. Claim 68 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zinchuk (4,060,426) in view of Kusian et al. (5,527,716) and Nath et al. (4,773,944) as applied to claims 63-65 and 67 above, and further in view of Sariciftci et al. (5,331,183).

Zinchuk discloses a photosensitive optoelectronic device having two transparent electrode layers but does not disclose a device in which at least one of the two transparent electrode layers consists of a conductive polymer.

Sariciftci et al. teach the use of conducting polymers such as polyaniline to make a transparent conducting electrode for a photosensitive optoelectronic device. Sariciftci et al. disclose conducting polymers as an alternative to conductive metal oxides such as indium/tin oxide.

It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute a conducting polymer such as polyaniline for a conductive metal oxide to make a transparent electrode for Zinchuk's device. One of ordinary skill in the art would have been motivated to do so by Sariciftci's teaching of conductive polymers as equivalents of conductive metal oxides in the manufacture of transparent electrodes.

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed.

Art Unit: 1774

Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. Claims 54-65, 67-70 and 72-74 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-2 of U.S. Patent No. 6,352,777 B1 or over claims 17-29 of U.S. Patent No. 6,297,495 B1, in view of Kusian et al. (5,527,716) and Nath et al. (4,773,944).

Claims 63-65, 67 and 68 are also rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 3-9 of U.S. Patent No. 6,352,777 B1 or over claims 1-16 and 30-39 of U.S. Patent No. 6,297,495 B1, in view of Kusian et al. (5,527,716) and Nath et al. (4,773,944).

The '777 patent claims an organic photosensitive optoelectronic device comprising a structure of electrode layers and photoconductive organic layers meeting the limitations of the at least one subcell required by the present claims.

The '495 patent claims an organic photosensitive optoelectronic device comprising a structure of electrode layers and photoconductive organic layers meeting the limitations of the at least one subcell required by the present claims with the exception that the '495 patent claims



only require one transparent electrode layer. While not requiring two transparent electrode layers, a second transparent electrode layer is not excluded by the claim language and would have been an obvious modification to one of ordinary skill in the art at the time of the invention.

The devices claimed in the '777 patent and the '495 patent do not require at least two subcells in superposed relationship but the patent claim language is open and does not exclude devices having stacked subcells. Kusian et al. disclose that the stacking of solar cells, and the electrical connection of stacked solar cells in series or in parallel, is known in the art (e.g. see col. 1, line 41-c. 2, l. 5). Nath et al. disclose a photovoltaic device having multiple photovoltaic cells connected in series and multiple photovoltaic cells connected in parallel (e.g. see col. 1, lines 8-17). Although the Kusian and Nath patents are directed to inorganic, rather than organic, solar cells, it is the examiner's position that one of ordinary skill in the art of solar cells at the time of the invention would have been motivated to provide the devices claimed in the '777 patent and the '495 patent with a stacked cell configuration, and electrically connect multiple cells in series or in parallel, in order to obtain the advantages of electrically connecting multiple cells as taught by Kusian or Nath.


9. Applicant is advised that should claim 60 be found allowable, claim 69 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Art Unit: 1774

10. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (703) 308-4413. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax numbers for Art Unit 1774 are (703) 872-9311 for official after final faxes and (703) 872-9310 or (703) 305-5408 for all other official faxes. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (703) 872-9041.)

MRY  
02/21/03



MARIE YAMNITZKY  
PRIMARY EXAMINER

1774